theories of plurals

Semantics 3, UCLA Linguistics

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0 extant theories of plurals

1. plurals denote sets (Schwarzschild, 1996)
2. plurals denote join semilattices (Link, 1983)
3. (plural count nouns denote some third type: ensembles (Bunt 1979), collections (Blau 1979))
4. there are no plural individuals, only events (Schwarzschild, 2009)

1 plurals denote sets

- D_e is the domain of individuals; the plurals are the power set of that domain $\mathcal{P}(D_e)$, minus the empty set
- (minus the singleton sets too?)
- prominent proponents: basically all the philosophers, and in particular Bennett (1974); Scha (1981); Hoeksema (1983); Gillon (1987); Schwarzschild (1996)[1]
- a few key ingredients:
  - plurals as sets of individuals
  - distributivity operators that distribute a predicate over entities in the plurality (Lasersohn, 1995, a.o.)

    (1) ^{D}jumped-in-the-lake'(the-girls') $\leftrightarrow \forall x[x \in [\![\text{the girls}]\!] \rightarrow x \in [\![\text{jumped-in-the-lake}]\!]$

    $*$ (why a distributivity operator, and not a collectivity operator?)
- but there are obvious differences between a plural definite and a universal quantifier (Brisson, 2003)...
- ...so we need a distributivity operator that allows for 'nonmaximality': involving **covers**, a.k.a. **partitions** (Schwarzschild, 1996)

  (2) $\forall x[x \in [\![Cov_i]\!] \wedge x \subseteq [\![\text{the-girls}]\!] \rightarrow x \in [\![\text{jumped-in-the-lake}]\!]]$

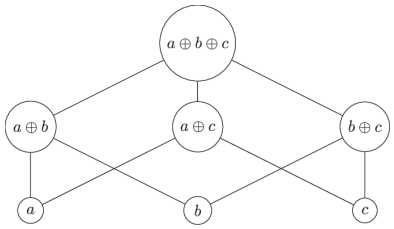
  (3) X covers Y iff:
  a. X is a set of nonempty subsets of Y
  b. $\forall y \in Y \exists x \in X[y \in x]$

  - lots of devils in the details here wrt quantifier scope, as well as words like *together* and *both*
- two other approaches to plural definites vs. universals (regardless of Theory 1 or 2):
  - words like *exactly* or *all* are not quantifiers of any sort, they're **slack regulators** (Lasersohn, 1999)
  - plural definites denote plurals, and the (non-)maximality that arises comes about via game-theoretic considerations (Malamud, 2012)

[1] In this section I'm artificially assimilating two different positions. See the appendix.

2 plurals denote join semilattices

- 'Linkian plurals,' Link (1983) (see also Krifka, 1989; Landman, 1989; Champollion, 2010)
- Link's intuition: carrot: carrots :: water : puddle
  the denotation of *carrots* is **constituted** of individual carrots, just as the denotation of **water** is constituted of drops of water
- idea: plural nouns denote join semi-lattices formed by summation[2], with $a \oplus b \oplus c \oplus d \geq a \oplus b \oplus c$, etc.:



- while singular nouns denotes sets of atoms, plural nouns denote sets that include pluralities[3]
- $[\![\text{-s}]\!] = * = \lambda P \lambda x.x$ is the smallest individual sum of members of P.[4]

(4) a. $[\![\text{student}^M]\!] = \{b, c, d\}$
b. $[\![\text{student}^M]\!] = \{b, c, d, b \oplus c, c \oplus d, b \oplus d, b \oplus c \oplus d\}$

(5) $[\![\text{A and B are students}]\!] = *\textsf{student}(a \oplus b)$

- a note on mass nouns:
  - A: the set of atoms of E
    - If $a, b \in A$: $a + b \in A$ (the "material fusion of a and b")
    - If $a, b \in A$: $a \oplus b \notin A$ (the "individual sum" or "plural object" of a and b)
  - $a + b$ constitutes, but is not identical with, $a \oplus b$.
    "Take for a, b two rings recently made out of some Egyptian gold. Then *the rings*, $a \oplus b$, are new, *the stuff*, $a + b$, is old."
- the $*$ operator and cumulativity
  - $P(a) \wedge P(b) \rightarrow *P(a \sqcup b)$, but not vice versa
  - so we need a distributivity operator:

(6) $\textsc{dist} = \lambda P \lambda x \forall y \leq x[\textsf{atom}(y) \rightarrow P(y)]$

- we need a notion of a cover, too, to account for nonmaximality:

(7) C minimally covers x iff $x \in *C$ and $\neg \exists C' \subset C[x \in *C']$
a. $\{b, c \oplus d\}$ minimally covers $b \oplus c \oplus d$
b. $\{b, c, d\}$ minimally covers $b \oplus c \oplus d$
c. $\{b \oplus c \oplus d\}$ minimally covers $b \oplus c \oplus d$
d. $\{b \oplus c, c \oplus d\}$ minimally covers $b \oplus c \oplus d$

(8) $\textsc{dist}_c(P) = \lambda x \forall y \in C_x[P(y)]$
where C_x is some pragmatically determined minimal cover of x

[2] In what follows, I will use $a \oplus b$ to mean what Nouwen writes as $a \sqcup b$ and others might write as ab.
[3] Hold the phone, why are we still talking about sets?!
[4] Specifically, $*X$ is the smallest set such that $*X \subseteq X$ and $\forall x, y \in *X : x \sqcup y \in *X$.

3 there are no plural individuals, only events

- Higginbotham and Schein (1989); Schwarzschild (2009)

  (9) a. The boxes are heavy.
  b. The boxes are large.
  c. The pile of boxes is large.

- the analysis, informally:

  (10) Features of Plurals and Events Theory (from Schwarzschild, 2009)
  a. distributive/collective ambiguity has to do with the number of event participants
  b. nouns are event predicates
  c. DP-argument events are connected to the main predicate event with statements about shared participants

- a bonus prediction for (certain) mass nouns:

  (11) a. The wine is large.
  b. The cocaine was long.
  c. The traffic is large.

  > "Being a stubbornly distributive predicate, *large* applies only to events with single participants. Therefore, e' [the event associated with the predicate, JR] has to have only one participant. Since *traffic* is a multi-participant noun, any of the es in (11-c) contains more than one participant. There could be no sharing of participants between e and e'.

- how are these data dealt with in the traditional (i.e. the other two) theories of plurals?
  - plural DPs denote pluralities; distributivity arises with the addition of a distributivity operator, effectively a null *each*, but attached to the VP or PredP

    (12) a. there is a plurality p consisting of the boxes, p is in the extension of *heavy* *collective*
    b. there is a plurality p consisting of the boxes, every singularity that is part of p is in the extension of *heavy* *distributive*

  - so it's not predicted that a predicate can only have a distributive reading but not a collective one
  - (why do we have a distributivity operator, then, and not a collectivity one?)
  - how do the mass data in (11) pose a similar problem for the traditional theories of plurals? (cf. *furniture* and *luggage*)

- I can't talk about this without quoting Schwarzschild on the dangers of conflating semantics with metaphysics:[5]

  > "The above investigation into the nature of the referents of mass DPs highlights an important issue concerning singularities and pluralities. The distinction does not have any physical or even perceptual basis. I cannot simply study the snow on my roof or reflect on how I think about it to decide whether or not it is a singularity or a plurality. When I ask you to notice the stars in the sky, I use a plural DP and hence I'm referring to a plurality. But the object I refer to is indistinguishable from what *the cluster of stars* refers to, even though the latter is a singularity."

[5] What are other methods of determining whether a semantic distinction reflects a metaphysical truth?

4 thinking about verbs and VPs (for next week)

- the question for next week... what does the extra lattice structure give us, empirically?
- singulars arising from plurals

(13) a. Carrying guns is illegal in Illinois. *cf.*
b. The sheep drink from the stream.

- plurals arising from singulars (pluractionality... and what else?)

(14) Yaa shùs-shùuri teebùɾˆ
3SG.MASC REDUP-kick table
'He kicked the table repeatedly.'

- quantizing the object

(15) a. B half ate the apple.
b. B half ate the apples.

appendix: Different set-based theories

From Bayer (1997) (p41-2):

> "For Schwarzschild, groups are sets, but there are no sets of sets, and thus no groups which are members of other groups. So everything in his domain of individuals is built out of atoms. Thus, Schwarzschild's domain is also a powerset algebra, and his group structure is only one level deep. I will call this the **one-level set account**. For Hoeksema, Landman, and Lasersohn, groups are sets, and they can be members of other groups. The universe of individuals is recursively structured, with the groups at one level serving as the individuals at the next level. This group structure is potentially infinitely recursive. I will call this the **multi-level set account**."

references

Bayer, S. (1997). *Confessions of a lapsed Neo-Davidsonian*. Routledge.
Bennett, M. (1974). *Some Extensions of a Montague Fragment of English*. PhD Thesis, University of California, Los Angeles.
Brisson, C. (2003). Plurals, *all*, and the nonuniformity of collective predication. *Linguistics & Philosophy*, 26:129–184.
Champollion, L. (2010). Parts of a whole: distributivity as a bridge between aspect and measurement.
Gillon, B. (1987). The readings of plural noun phrases. *Linguistics & Philosophy*, 10:199–220.
Higginbotham, J. and Schein, B. (1989). Plurals. In *NELS 19*.
Hoeksema, J. (1983). Plurality and conjunction. In ter Meulen, A., editor, *Studies in modeltheoretic semantics*. Foris.
Krifka, M. (1989). Nominal reference, temporal constitution and quantification in event semantics. In Bartsch, R., van Benthem, J., and van Emda Boas, P., editors, *Semantics and Contextual Expression*, pages 75–15. Foris.
Landman, F. (1989). Groups i & ii. *Linguistics & Philosophy*, 12.
Lasersohn, P. (1995). *Plurality, Conjunction and Tense*. Kluwer.
Lasersohn, P. (1999). Pragmatic halos. *Language*, 75:522–551.
Link, G. (1983). The logical analysis of plurals and mass terms: a lattice-theoretical approach. In Bauerle, R., Schwarze, C., and von Stechow, A., editors, *Meaning, Use and Interpretation of Language*, pages 302–323. Walter de Gruyter.
Malamud, S. (2012). The meaning of plural definites: A decision-theoretic approach. *Semantics & Pragmatics*, 3:1–58.
Scha, R. (1981). Distributive, collective and cumulative quantification. In Groenedijk, J., Janssen, T., and Stokhof, M., editors, *Formal Methods in the Study of Language*.
Schwarzschild, R. (1996). *Pluralities*. Kluwer.
Schwarzschild, R. (2009). Stubborn distributivity, multiparticipant nouns and the count/mass distinction. In *NELS 39*.